The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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The War of the Factories

DURING a recent tour of industrial plants in Lancashire, Mr. Ernest Bevin, Minister of Labour, urged employers to give girls a ten-minute break during the last hour of work, in which they could have hot coffee to drink and something to eat to fortify them before beginning the journey home—sometimes a long chilly affair—in the evening hours. Little considerations of that kind, Mr. Bevin said, might save him millions of hours. A far-sighted policy of this kind is what enables the workers to "go to it" with a will, and with a real prospect of increasing production far above the normal. One of the first and most important discoveries made by the National Institute of Industrial Psychology was that a "tea break," so far from leading to reduced industrial production on account of the shorter period spent literally at the work-bench, was actually followed by a definite and perceptible rise in both quality and quantity of production.

We should have thought that the principle of the occasional short break as an advantage to both employers and employees had been fully recognised throughout the country; and indeed we are persuaded that the vast majority of industrial concerns are quite alive to the position and have been pursuing the reasonable course for many years—in peace time as well as under war conditions. We were all the more surprised to hear of a large government-managed factory, recently, where 12-hour shifts, without an official break, were demanded of certain of the workers. Admittedly the work in hand was of supreme urgency and importance. But we gravely doubt whether such a system is the best way of attaining the desired result. We feel justified in asking whether a workman is going to turn out the optimum quality and quantity of production when he is wondering whether he will have time for a bite at a sandwich and a gulp of tea or coffee during working hours.

This, however, is an exceptional case, and the arrangement for the inordinately long breakless period was probably due to the misguided enthusiasm of some departmental understrapper who knew nothing about the investigations that have been made into working conditions. At any rate, these conditions do not prevail in all Government-run establishments. Another instance of quite a different sort has been brought to our notice, wherein the contrast would be positively comic were it not that present-day conditions demand a serious view of the situation. Owing to an "alarm" following an "alert," workers had taken refuge in their shelter round about midday, when the following announcement was made by a responsible official, who evidently missed the humour of his own remarks: "People whose half-day off it is may go home at their own risk; people who have not had dinner may go out and get it at their own risk; but people who should be working must remain in the shelter!" Still, as a correspondent of *The Times* said (perhaps a little acidly) the other day, we shall win the war in spite of the Civil Service!

But to return to the question of how to cause the factories to produce their best in this emergency; if Mr. Bevin's recommendations and instructions are faithfully carried out—and we are convinced that hundreds of devoted souls are even now seeing that they *are* carried out—not only will our production be greater than ever before, but also our producers—the men actually on the job—will be happier and more satisfied than ever before. If the workers know that they and their families will be cared for in sickness as in health; if they are assured that a sensible "Jim Crow" system is in operation to give them timely warning of imminent danger; then they will work with that indomitable spirit, the strong suit of the British workman, unimpaired and unhampered. And, what is more, there will remain a reserve left over for emergencies. This is an important matter, for it involves another strong point of the British character—talent for improvisation—which is what has enabled bombed factories to carry on with only a small and temporary drop in production. A learned scientist was once heard to say, in a lighter moment, that this gift of improvising was entirely due to the British weather, which made it quite impossible to make plans in advance. He may be right; at any rate no one will dispute the existence of the talent—certainly not those members of the chemical industry who recollect the dodges and subterfuges of war-time chemical production in 1914-15.

In sum, the task of the chemical industry, like every other key industry to-day, is to produce up to the maximum and up to the optimum. This is not to be done by slacking, nor by taking shelter unnecessarily, nor yet by overdriving willing workers. The cool head and the clear-sighted eye, capable of summing up the tactical situation of the moment, are as important in the economic war as in the line of battle, and theirs is the final victory in every field.

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NOTES AND COMMENTS

Wholesale Prices in September

THE Board of Trade Index Number for wholesale prices of industrial materials and manufactures for the month of September is 141.6 (1930, 100); for chemicals and oils the figure is 119.8; for iron and steel 163.4; and for non-ferrous metals 123.0. Compared with the August figures, that for chemicals and oils represents an increase of 0.4 per cent.; that for iron and steel an increase of 0.1 per cent.; and that for non-ferrous metals a decrease of 0.5 per cent. In the past twelve months (that is, since September, 1939), the respective increases are 27.7, 27.6 and 17.8 per cent. Among chemicals and oils, the principal changes since August were the increases on September 24 for motor spirit, 1d. per gallon (5 per cent.); burning oil, ½d. per gallon (5 per cent.); and fuel oil, ¼d. per gallon (3½ per cent.). The aggregate increase in prices of industrial materials and manufactures since the outbreak of war was 38½ per cent., but in comparison with August there was a decrease of ½ per cent., this being the first recorded decrease since war started.

Mineral Resources of Indochina

RECENT movements in the Far East have brought French Indochina prominently into the news, and this vast territory of some 285,000 square miles, with its natural resources largely untapped, is evidently attracting the attention of the Japanese, no doubt with a view to its development for their own advantage in the not too distant future. French policy was inclined not to encourage colonial industrial undertakings lest they might become competitors with domestic manufacturers; and Indochina had been regarded rather as a purchaser for French imports than as a producer of exports of her own. The mineral resources of the northern part of Indochina are, however, very considerable, and, in the event of a change in the national economy of the Far East, they are worth taking into consideration. Tonkin anthracite, for example, is known for its high quality, and tin also is mined in that area, this product having been absorbed largely by Great Britain, France, and Holland. The ores of iron, manganese, zinc and lead in the colony have been largely neglected by European interests, while little more is known of the deposits of graphite and phosphates than that they are in existence. Statistics for 1939 show that Japan increased her imports of Indochina manganese ore, taking 2750 out of the total of 2860 tons exports (1938 total, 480 tons). Since 1937 all the iron ore exported from Indochina went to Japan, last year's shipments amounting to 75,560 tons.

Safety First

OWING to the somewhat irregular state of the postal services, our regular feature entitled "Notes from Works Safety Jottings" is held over until next week from its accustomed position in the third issue of the month. Mr. John Creevey, whose investigations into the best modern practices for the furtherance of chemical safety necessitate a certain amount of travelling, has come nobly up to the scratch, and readers who have been following with interest his consecutive and progressive line of argument may rest assured that his manuscript has duly come to hand, although, for once in a way, it arrived later than usual. Consideration for our printers, who are working under certain inevitable difficulties, has, however, persuaded us that it would be better to inflict this slight irregularity upon our subscribers rather than cause undue hardship in the press, and we offer this apology in the complete confidence that our readers will meet it with full understanding. The practice of regular periodical journalism in London, these days, is not without its difficulties, but nevertheless we are maintaining undaunted our ideal of continuous and uninterrupted publication. Authors, editorial staff, publishing staff, and printers have all rallied alike to the cause, and we are confident of keeping up the service to the chemical industry that is the prime motive and the proud claim of THE CHEMICAL AGE.

British Chemical Prices

Market Reports

WITH a fair volume of business spread over most sections of the market and values generally continuing strong, trading conditions for industrial chemicals have been fairly active during the past week. Borax and boric acid are steady and unchanged and a firm market continues for such items as oxalic acid, barium chloride and the potash products. Chlorate of soda and acetate of soda are receiving a good inquiry. Movements in the coal tar section remain on a comparatively small scale, although a fair volume of inquiry for fresh business is reported chiefly to meet spot requirements. Crude carbolic acid and cresylic acid are steady with a fair undertone.

MANCHESTER.—Although actual price changes compared with a week ago have been few, there is a decidedly firm undertone in many sections of the Manchester chemical market and only in rare instances are there any indications of easiness. Fresh bookings during the past week have mostly been in respect of near delivery positions and have been moderate in the aggregate, while the flow of delivery specifications against contracts has continued on a fair scale in respect of most of the heavy chemicals. With regard to the by-products, the light distillates without exception are on a firm basis and are moving steadily into consumption. Cresylic acid, however, is quiet and in excessive supply, with prices still tending easy.

GLASGOW.—The Scottish heavy chemical trade still remains steady and prices continue to keep firm. Business in the export trade has not improved, and remains rather quiet.

Price Changes

Ammonia Anhydrous.—99.95%, 1s. 7d. to 2s. per lb., according to quantity and type of cylinders, which are returnable, carriage paid; less for important contracts.

Pyridine.—MANCHESTER: 16s. to 19s. 6d. per gal.

Tartaric Acid.—MANCHESTER: 2s. 8d. per lb.

PHYSICAL AND CHEMICAL TREATMENT OF SOLID FUEL

The Problem of Dust Removal

by G. E. FOXWELL, D.Sc.

THE chemical industry, the industry which produces substances for use by other industries, is by the nature of things constrained to find an outlet for its products in many, and frequently in unexpected, directions. For the more specialised chemicals, such as drugs, dyes, fertilisers and so forth, there is generally only one outlet though there may be many applications. Dyes, for example, may not be used only for dress materials or furnishings, but have been applied to roofing materials and in other unusual directions; in the same way ammonia, which was formerly considered primarily as a fertiliser, now finds a most important field in the explosives industry, and is of service for household purposes. Broadly speaking, it is the chemicals which are produced in bulk for which the chemical industry must seek intensively for additional outlets. It may be that at the present time the demands for export or for home consumption for war purposes are sufficient to render additional markets undesirable, but the wise chemical manufacturer is looking ahead to the conclusion of the war when he will have to find additional markets in order to utilise his plant to its maximum capacity. It happens that the solid fuel industry may provide such an outlet for two products of the chemical industry.

An outstanding feature of the fuel industries during the past few years has been the recognition that it is not sufficient to produce fuel and then to throw it to the consumer as one throws a bone to a dog; but the fuel must be carefully processed and prepared so that it is suitable for the purpose for which it is required and finds favour with the consumer, just as the chef prepares a meal for human consumption.

One of the principal complaints made against fuel of all kinds is their dirtiness. Dirtiness can be caused in two ways. It can result from the ash which is carried into the room when a fire is poked and particularly so when a cold fire is cleaned the following morning. Coal is an offender in this respect only in so far as it contains some 0.5 to 3 per cent. of inherent ash which is very finely divided. When coke is made from crushed coal the greater part of the ash is in this pulverulent form, and on being disturbed by the poker or the hand of the cleaner readily flies into the air and is airborne on to the furniture. No cure for this difficulty has yet been devised, and chemical manufacturers who produce material which may prevent this, perhaps by causing the fine material to ball together during or after combustion into larger aggregates that can no longer be air-borne, might do well to investigate this problem. It may be that by mixing a flux with the fuel, or by throwing a handful of the flux on to the fire during the evening, the desired result could be achieved.

Dust-Proofing of Coal

Whilst this refinement is yet in the future, the cure for another cause of dirt is very much in the present, or at least in the immediate future. All solid fuels contain a proportion of dust which, when the fuel is disturbed, flies into the air. There are few things more annoying to the domestic purchaser of coal than the dust which settles around the house, on the washing and so forth, whenever a load of coal is delivered, and, to a less extent, when coal or coke is lifted from the cellar or store. In coal much of this dust arises from the fusain which is the constituent of coal that looks like woody fibre and dirties the hands; some, of course, is due to abrasion. In coke the dust is due to abrasion. The problems of treating coal and coke are somewhat different. House coal is hand-picked and is generally not washed, except in the smaller sizes, so that there is no possibility of eliminating dust by mechanical means prior to delivery to the householder. For this reason in the U.S.A. a movement has originated to dust-proof coal in order to render it more acceptable to the domestic consumer. It can readily be understood that this step is necessary in a country where home-produced oil is a direct competitor of coal and possesses many of the advantages in which coal is strikingly deficient. The initial development of coal dust-proofing is said to have arisen in the West Virginia low-volatile coalfields, where three companies began experiments with calcium chloride in 1926. Since that time, a wide range of material has been applied to coal to render it dustless, including various chemical solutions, miscible oils, paraffin, oil-chemical combinations, hot or cold oil and wax. Starting with an early installation at an Illinois mine, in 1934, the "hot vapor" oil process advanced rapidly in many of the producing regions of the country. "Waxolised" coal is another recent development, along with high-pressure cold-oil spraying. One feature of the developments in dustless treatment since its inception is the trend towards treatment at the mine.

Physical Removal of Coke Dust

Coke is in a different category, first because of its different structure, which allows it to absorb considerable quantities of liquids, and secondly, because much of the dirt in coke can be removed during manufacture. The physical removal of coke dust depends to a great extent upon the process by which the coke is produced. There are two distinct dust problems, one general and one specific. The general problem is that of the dust which is inevitably produced during handling, particularly after screening. It is possible to remove this dust from sufficiently dry coke by rescreening, and, as is pointed out elsewhere in this article, debreezing screens should be installed at the outlets of the hoppers so that coke should be dedusted finally just before loading into lorries or bags for transport to the consumer. Whether debreezing is necessary or advisable for coke loaded into railway wagons is another matter. The ideal practice would seem to be for the coke merchant to debreeze before reloading to his consumer. The breeze and dust formed in this way is relatively large in size, and causes no particular trouble if adequate plant is installed to extract it at the right place.

The specific problem of the very fine dust formed during carbonisation, however, demands difficult treatment. Dirtiness in coke in the domestic sense is a function of the fine dust content. This dirtiness does not appear to arise from coke dust formed during handling, for that dust is sufficiently large not to become air-borne under most conditions. Dust formed during carbonisation, and particularly from steamed gas retorts which discharge their coke dry, may be particularly difficult to handle. A proportion of the coarser dust readily removed by screening is, of course, produced during carbonisation, but there is also a great deal of material in an exceedingly fine state of subdivision, which is formed partly by the action of the steam on the retort in steamed verticals, and partly from the breakdown of the exterior coke cells during the travel of the material down the retort. This class of dust is virtually non-abrasive because of its small grain size. It has been found that it can be readily removed from dry coke, but that wetting the coke causes it to adhere to the pieces, or to be carried into the interior of the cells, whence it is again released when the coke dries, to the distress of the householder. It has been found that this fine material can be removed from dry coke when first discharged from the retort, and that once removed it does not again appear. Plants to deal with this problem have been erected by West's Gas Improvement Co., Ltd., the principle of which is that an

extraction fan with ducts leading through a set of filters from the chute by which the cool discharged coke is fed to the conveyors, is fitted to the chassis through which the discharging chute is carried below the retort bench. The top of the chute is kept closed, except at the point opposite the actual retort which is being discharged to reduce the amount of ineffective work thrown upon the fan; consequently, air is drawn in only along and through the stream of coke issuing from that retort. Intakes of the dust-laden air from the coke skip to the filter are arranged at suitable points in the side of the chute and at the point where the coke leaves the chute and falls into the conveyor. The filters are shaken, generally after each complete discharge of the retorts in the bench, and the dust emptied out into a suitable receptacle. The filters may be either of the bag type or may consist of a bed of metallic shavings arranged on shaking frames. From one installation 2 to 3 lb. of dust are recovered per ton of coal carbonised, and a grading test shows that all the dust passes through a 50 mesh, and nearly half of it through a 100 mesh. The dust recovered from the installation concerned contained 0.73 per cent. moisture, 13.13 per cent. ash, 1.26 per cent. volatile matter and 84.88 per cent. carbon.

Research into the Debreezing Problem

In spite of all that can be done in this way, however, the processes of coke breaking, screening and handling inevitably produce a further quantity of dust which is found to adhere to the larger pieces of coke, perhaps by some form of static electrical attraction. An attempt is made to deal with this dust by debreezing screens at the outlet of the final coke hopper, but the coke is still sufficiently dusty to warrant treatment. Mr. W. Boon, in his paper to the Institute of Fuel on October 8 last, has recounted how one large gas undertaking immediately prior to the outbreak of war was about to initiate research on this problem upon a large scale. The chemical industry is also engaged upon research on this problem. Mr. Boon considers it very necessary that when normal conditions return such investigation should proceed, especially in view of the widespread desire of producers to improve the quality of coke and eliminate whatever disadvantages it might have had. Coke with the attributes of high calorific value, low ash and moisture content, grading, ignitability, etc., is a yet better fuel if the dust nuisance is mitigated.

Many claims have been put forward on behalf of dust-proofed solid fuel. The more reasonable of these are as follows:—

(1) Up to 75 per cent. of the dust usually present may be eliminated. This has the following advantages:—
  (a) Cleanliness of handling at all points.
  (b) Reduction of the danger of spontaneous combustion.
(2) Freezing during transport is minimised.
(3) On account of the lubricating effect of the treatment:—
  (a) Degradation during transport may be reduced.
  (b) Uneven motion in bins, hoppers, etc., is probably reduced.
(4) Corrosion of bins, hoppers, etc., due to wet fuel may be reduced.
(5) Undocumented claims have been made that the amount of clinker from treated solid fuels is reduced and that the clinker when formed is porous.

The duration effect of dust-proofing of coke has not yet been investigated, although coal figures are available from U.S.A. It has been shown that proofing remains effective for three months, coal proofed to 20 grammes of dust per ton containing 35 to 40 grammes of dust per ton at the end of that period. The cost of dust-proofing coke upon pre-war prices has been estimated to be from 4½d. to 14d. per ton of coke, according to proofing material used.

American practice has approved the use of calcium chloride because this material gives greater permanency than other materials, and is reasonably proof against freezing; it does not increase the fire hazard. The use of oil for dust-proofing coke will cause an otherwise smokeless fuel to become smoky, and thus calcium chloride has its advantages and in addition does not impart to the fuel any obnoxious odour. The charge has been levelled against calcium chloride that it increases the possibility of the corrosion of steel surfaces with which the coke comes into contact, but this does not appear to be a serious indictment in the light of practical experience.

The general method of treating coke is to spray a 25 per cent. solution of calcium chloride solution on to the coke under a pressure of 50 to 200 lb./sq. in., but care must be taken that the surface is adequately covered without losing calcium chloride in the interior pores of the coke to no advantage. Very small amounts are sufficient to lay the dust bogy.

So far as is known, coal has not been dust-proofed in this country yet, but undoubtedly the coal industry will awaken to the necessity before long. American practice in coal dust-proofing with oil has been described by H. H. Morris of the Sun Oil Co., Philadelphia, from whose paper the following information is largely derived. Much of the information would apply to calcium chloride. Petroleum products used for coal dust-proofing must be non-corrosive, free from objectionable odours, possess proper "wetting" and "creeping" characteristics, have a high degree of permanency, and a low "pour-point," preferably below zero.

Two types of oil that are used are described by Morris as follows:—

	Oil "C"	Oil "CBO"
Flash	310° to 320° F.	300° to 320° F.
Fire	350° to 360° F.	340° to 360° F.
Viscosity (S. U.)	109 to 115	*210 to 225
Pour test	−40° F.	−30° F.

*Sec. at 100° F.

The most usual practice is to apply oil, either preheated or cold, directly to the coal. However, in certain instances at mines where a large percentage of the slack coal (below 2 in.) consists of very small size coal (for example, minus 10 mesh), emulsions have been used with success. An emulsion may be made by adding sodium resinate as an emulsifying agent to the usual coating oil. The resulting emulsion is unstable, but if kept in continuous agitation, it is commercially satisfactory. The advantage of an emulsion is that the water acts as a "carrier," permitting the emulsion to penetrate more readily through the fine coal. Furthermore, by the addition of sodium resinate, the "surface tension" is decreased, permitting greater penetration through very fine particles of coal. The objection to all emulsions is that unless adequately protected in freezing weather they will freeze and separate; and when they are applied to coal in freezing weather, care must be exercised so that too wet a mass will not be produced in the trucks or the coal will freeze in transit.

Cold and Hot Oil Systems

The cold oil system is based on the use of a pressure of 300 to 600 lb./sq. in., using an impact type nozzle capable of atomising the oil into a spray fog to provide the most effective coverage of the material. The complete system includes the pumping unit with its driving motor and other accessories and oil storage tank, spray nozzles, and the necessary piping. It is recommended that the storage tank be placed underground, but if this is not possible provision should be made for heating it in cold weather. The nozzles should be so situated that they can act on a moving or falling stream of the material under treatment. To confine the spray fog, the point at which the oil application is made should be enclosed.

The underlying principle of the hot oil system is that with a constant low pressure, constant viscosity of oil, and a constant size of orifice, uniform quantities of oil will be delivered through the nozzles in a given interval of time. This system consists in the main of a motor-driven pressure pump, one or more steam or electric heaters, as near as practical to the spray nozzles, a small circulating pump, and the necessary piping valves and spray nozzles. The pressure pump is so designed that a constant pressure at the nozzles will be maintained between 100 lb. and 150 lb./sq. in. The heater raises

the oil to a predetermined temperature, and therefore the viscosity of the oil remains constant. If the nozzles are closed, provision is made for the pressure pump to continue in operation; but the oil is by-passed so that pressure is not built up in the line.

No matter what oil is to be applied for dust-proofing a fuel, the utmost care must be given to the selection of the place for treatment. Coal is generally being treated at one or more of the following points: at the end of the loading boom, as coal falls into the railway waggons; at the mouth of vertical chutes which load slack coal directly into the waggons; at the end of shaking chutes as coal falls on loading booms or belts; on the flat part of the loading boom after the coal has passed that portion used by the "pickers" and before it passes over the "knuckles" of the boom; and at the "knuckle" of the boom. Generally, it is considered best to treat the coal as it is falling. This permits all sides of the coal to come in contact with the oil spray. The end of the loading boom is the point selected by the majority of coal operators for treating, though on windy days some of the oil floats away and is lost, so that hoods are constructed over the ends of the booms. Even if a point of application is chosen that is within the preparation plant, hoods should be constructed to keep the "oil fog" from floating throughout the plant.

When dust-proofing coal was originally considered, it was believed that the primary objective in eliminating dust was to make a product that would be more acceptable to the users of domestic fuel, to permit coals to enter new markets, and in some districts to eliminate the encroachment of substitute fuels. In a large measure these aims have been accomplished, but during the years of development, additional benefits were discovered, among which are:—

(1) Oil treatment of coal helps minimise the segregation of fines in stoker coals, thereby giving a more even fuel bed.
(2) Oil treatment permits coal to run more freely from railroad cars and storage bins.
(3) Oil treatment gives somewhat better ignition to the coal.
(4) Oil treatment helps to lubricate the feed of mechanical stokers.
(5) The oil film checks "slacking" of coal that has been placed in storage.
(6) Oil tends to decrease freezing of moist slack coal and the smaller sizes of coal when shipped in railway cars during winter.
(7) Oil materially overcomes the past troubles of coal "arching" in hoppers.
(8) If certain sizes are oil-treated after washing, the treatment permits some reduction of the water content of the coal when compared to that of untreated coal.

Alkali Activation

Reference has recently been made in THE CHEMICAL AGE (1940, *42*, 1095, p. 335) to the alkali activation of coke by the addition of sodium carbonate and lime to the coal before carbonisation and of sodium carbonate only to the coke after carbonisation. The purpose of this treatment is to render the coke more combustible and it will provide a valuable outlet for soda ash if the process comes into general use; and the most satisfactory results have been obtained when the coke particles are moving in a spray mist of sodium carbonate solution, thus presenting continuously changing surfaces to the spray. Some little attention has been devoted here to the method of activation of coke outside the retort because it would seem that a technique which is satisfactory for performing this operation might equally be adapted to the spraying of coke with calcium chloride for de-dusting. During the discussion on Mr. Boon's paper it was suggested by Dr. C. H. Noton that "outside" activation and dust-proofing could be performed simultaneously in the same operation by using two nozzles.

It would seem that there is a very large potential market for calcium chloride or for certain other hygroscopic or "sticky" substances either alone, or in solution, or as emulsions, for dust-proofing coal and coke. No settled practice has yet been evolved for performing this operation and the way is open to inventors and research workers to enter this field by investigating the applicability of new materials or by devising new processes by which the desired result can be achieved. It may be assumed that between 50 million and 60 million tons of coal and coke are delivered to the domestic consumer annually, so that the market would be immense. Equally, there appears to be a possible outlet for sodium carbonate in the carbonising industries. This is, however, being adequately developed by Messrs. Imperial Chemical Industries, Limited, and development has already gone a very long way towards finality, although it has not yet been accepted as standard practice by the carbonising industries.

Chemical Matters in Parliament

Utilisation of Waste

IN the House of Commons last week Mr. Stokes asked the Minister of Supply whether he would arrange for at least one person with scientific qualifications to be appointed to the Inter-Departmental Committee on Salvage, with the object of providing useful advice on the conversion and utilisation of waste matter in the light of recent scientific and technical developments.

Mr. Harold Macmillan replied that the Inter-Departmental Committee on Salvage at their meeting on September 5 had appointed as technical adviser Mr. J. C. Dawes, O.B.E., M.I.Mech.E., who for many years had been Public Cleansing and Salvage Inspector in the Ministry of Health. Mr. Dawes, who was chief technical adviser to the National Salvage Council in the last war, was specially qualified to provide useful advice on the conversion and utilisation of waste matter. In addition, the services of the Director of Scientific Research of the Ministry of Supply were available to this Committee.

Manchester Sewage Works

Results of Activated Sludge Treatment

IN the annual report of the Manchester Rivers Committee, an account is given of the treatment of sewage by the activated sludge process at the Withington Works. It is stated that the average effluent from the works consists of a mixture of the discharge from the secondary contact beds and the effluent from the activated sludge plants. The average analytical returns for the past year (stated in parts per 100,000) are as follows:—

Four hours oxygen absorption	0.97
Three minutes oxygen absorption—	
Before incubation	0.36
After incubation	0.43
Ammoniacal nitrogen	1.87
Albuminoid nitrogen	0.16
Nitrous nitrogen	0.01
Nitric nitrogen	0.22
Combined chlorine	8.3
Suspended solids	1.9
Biochemical oxygen demand	1.62

The average daily sewage flow at Davyhulme works is 55,172,000 gallons. The following average analytical returns (stated in parts per 100,000) indicate the strength of the sewage received during the year:—

Four hours oxygen absorption at 26.7° C. ...	10.98
Ammoniacal nitrogen	2.87
Albuminoid nitrogen	.90
Combined chlorine	25.9
Suspended solids—mineral	6.8
,, ,, organic	16.3
Biochemical oxygen demand	21.68

The Institute of Fuel

Presidential Address

AT the meeting of the Institute of Fuel, held on Thursday last to mark the opening of the 1940/41 session, Mr. W. M. Selvey, M.I.C.E., M.I.Mech.E., M.I.E.E., F.Inst.F., presented a short presidential address. Mr. Selvey has been acting as president during the absence abroad of Lt.-Col. J. H. M. Greenly.

In the course of the address, Mr. Selvey remarked that the Institute had carried on its business without any events causing apprehension. After a short evacuation of the offices, the secretary and staff returned to town, and were now, like all London residents, experiencing to the full the strain of aerial warfare. The network of associations of free minds was typified in the Institute, which was holding firmly to its marked, if comparatively short tradition. During all the strain of the past year of war, new membership applications had been continually received and mostly accepted.

"One might reasonably ask," he said, "what is the nature of the bond which holds together minds of such a wide diversity of interests. Our title suggests it in the word 'fuel.' But the man in the street may object, what commoner or less interesting subject could there be than the stuff which I consume away in my fires, and the unconsumed residue of which affords me many comfortable sources of grumbling? And yet we can point out to him that our list of members, small as it is in these great days, comprises a high proportion of the principal fuel technologists; many with world-wide reputations. The most valuable goods can be done up in the smallest parcels. But it is the diversity of interests which is most marked—coal, coke, patent fuel, electric power, town's gas, producer gas, fuel oil, petrol, all have their experts among the membership. Under the ægis of the Institute many of these have come to know each other for the first time, and in other cases improvement of casual acquaintance has ripened into a community of interest. We may have considerable confidence that, come what may, there will always be the need for this common ground of meeting, and an Institute to fill the need."

Wider Use for Technologists

Continuing, Mr. Selvey spoke of the pure scientists, who evolved theories and hypotheses with great ingenuity, which in course of time fell and changed with the evolution of knowledge brought to light by their efforts. Seldom, if ever, could they say with certainty what they went out to see, but the light which comes ever spurred them on to further efforts. This marvellous evolution of knowledge was open to all workers in all nations. "The implications of this knowledge," Mr. Selvey went on to say, "belong to the realm of philosophy, but the practical applications belong to the realm of technology. It is generally, say, twenty years, and often longer, before scientific knowledge produces practical applications which enter into the common life of the community. These applications may be for good or the reverse, and of late years there has been much heart-searching among the pure scientists as to whether they are morally justified in increasing physical knowledge to be put to such dangerous uses. The solution of the problem does not seem to be along the lines of smothering the scientists, or putting the technologists on the dole, but rather in considering what sort of men shall ultimately compose that small inner coterie existing in every country which has the power and responsibility of putting these great forces into action.

"These men to-day are primarily educated in what used to be called the 'humanities,' and this form of education leads to an astute knowledge of how to govern men through their lesser qualities and, indeed, their weaknesses. The growing reaction against this form of education of our finest minds has resulted, not in changing their form of education, but in replacing them by representatives of the 'people,' mostly great-hearted men, but who have this in common with their colleagues of the former type; that in discussions of any grave difficulty they can always brush aside questions which demand answers by saying they are purely technical. It is a most amazing state of affairs that in a world which is fast becoming wholly technical, the men having the power and responsibility can almost boast of their ignorance on technical questions. Yet there are countries where the men in real power are technically trained as a basis for their future activities, educated to some degree in the scholastic field of knowledge, but totally devoid of morals when acting as functionaries of the State.

The Scientist as Administrator

"It is not more difficult to distinguish among young technologists than among young classical graduates what men are likely to develop into administrators. The House of Commons throws up men from widely different environments. The future may, however, demand for very existence that the early training of these men should be technological as well as or more so than humanistic, not because there is more virtue in one than the other, but because they must function in an almost wholly technological world. The virtue lies not in either form of training, but in a moral, ethical and religious training superimposed on any form of merely materialistic or philological knowledge. That this kind of statement is more than just a voice in the wilderness can be proved from the columns of our great national organ, *The Times*, for the past year or so. Everywhere there is a growing consciousness that something must be changed before it is safe to put further powers evolved by scientists and technologists in the hands of those governing the political fortunes of the State. But the scientists and technologists must go on. The forces which drive them almost compel the evolution of more and more knowledge, and, therefore, it must also follow that they must themselves delve deeper into those questions which they in turn have been equally amiss in shelving as political, moral, ethical and religious. We cannot perpetuate these watertight divisions of thought, action and responsibility and continue anything remotely like the civilisation which we have known or looked for in the future."

CARBON STEEL CORROSION

In a paper on "Metallic Corrosion," presented before the meeting of the American Chemical Society at Detroit, Michigan, last month, Glenn H. Damon, of the Michigan College of Mining and Technology, stated that the corrosion rate of five different carbon steels had been determined for 13 different concentrations of sulphuric acid ranging from 1 to 35·5 N. In all cases, the maximum corrosion rate fell between 11 N and 14 N, with the higher carbon steels much more corrosive than the lower. The data showed that a steel between 0.06 and 0.37 per cent. carbon had the lowest corrosion rate. All steels tested became passive in acid more than 17 N. The passivating film was shown to be ferrous sulphate.

A leaflet sent out by CAMBRIDGE INSTRUMENT CO., LTD., 13 Grosvenor Place, London, S.W.1, describes the Cambridge Polarograph, which has been designed for the rapid chemical analysis of solutions by an electro-chemical method. Most metals and many acid radicals and organic substances, it is claimed, can be determined both qualitatively and quantitatively.

Preparation of Drying Oils

New Development in the U.S.A.

THE dependence of the United States on foreign sources of drying oils has been given special prominence recently in consequence of the American programme of preparation for defence. The following article is taken from a paper by D. V. Stingley, of Armour and Co. Auxiliaries of Chicago, published in *Industrial and Engineering Chemistry* (1940), *32*, 9, 1217-1220.

One of the most recent developments of consequence in the preparation of drying oils in America has been the production of synthetic glycerides from fractionally distilled fatty acids. In the past the practice has been to employ straight distillations only in the production of distilled acids which have substantially the same composition as the natural oil from which the crude fatty acids were obtained. An entirely new type of distillation has been made possible in part by the introduction of special alloy vacuum fractionating columns. These columns permit the use of special processes whereby separation of the various fatty-acid components can be achieved. Then by the subsequent re-esterification of suitable fractions, drying oils with a maximum degree of desired properties can be produced. Although this process is not limited in scope to any specific class of raw materials, marine oils have been found excellent for this purpose.

Natural fats and oils of marine origin are sharply differentiated from all other classes of fats and oils because of their high content of highly unsaturated acids containing 20 and 22 carbon atoms. The physical properties of these oils are different in many respects from other oils, these differences being in general directly traceable to their unusual composition. Although little is actually known concerning the basic glyceride make-up of marine oils, it has been shown by H. K. Dean that probability to a large extent governs glyceride structure in oils; and we can postulate from the fatty-acid composition that marine oils are composed of a mixture of glycerides of fatty acids, varying from almost completely saturated glycerides to the most highly unsaturated known.

The saturated and partly saturated glycerides present in marine oil are thought to act as plasticisers and inhibitors in film formation, and various methods have been employed to improve their drying qualities. In general these methods have in the past been based on the fractional crystallisation and subsequent removal of the saturated glycerides. Unfortunately such methods fall short of achieving the desired results, largely because the mixed glyceride structure does not permit efficient separation by these means. If, however, the fatty acids of marine oils are liberated and separation is effected by the fractional distillation process, it is possible to isolate drying and non-drying fatty acid fractions. For example, from sardine oil it is possible to produce non-drying fatty acids comparable to tallow fatty acids and drying fatty acids with extremely high unsaturation.

Neofat No. 19

"Neofat No. 19" fatty acid is a representative commercial product of this type of processing. The fatty acids which comprise its major constituent—namely, the unsaturated acids of 20- and 22-carbon chain length—are a rather specialised group. From the information now available these acids are believed to include mono- and diethylenic as well as tri- and tetraethylenic fatty acids. Unfortunately, acids of the C_{20} and C_{22} group are difficult to isolate; many have not been identified and must of necessity be referred to simply as unsaturated C_{20} and unsaturated C_{22} fatty acids. For our present purpose this is a satisfactory designation, inasmuch as our interest is essentially with their properties as a group. A pertinent point concerning these acids is that in their entirety they fall almost completely in the non-conjugated system. Considering this fact and also their high degree of unsaturation, it is possible to predict rather unusual physical and chemical properties for both these acids and their derivatives.

Neofat No. 19 fatty acid is composed chiefly of such acids with certain unsaturated C_{18} acids also present. Its colour is pale yellow and its average chemical and physical constants are as follows:—

Titre, ° C.	20
Iodine value (Wijs)	235
Neutralisation value	184
Mean molecular weight	305

When first introduced to the trade Neofat No. 19 fatty acid had an average iodine value of 250, but experimental results soon indicated that for commercial applications in the production of alkyd resins this degree of unsaturation produced heat-reactive alkyds which frequently gelled in the cooking equipment; consequently it was found advisable to lower the iodine value to the present standard. Neofat No. 19 fatty acid produces excellent air-drying and baking alkyds. These alkyds have good colour retention, and air-dried or baked films are practically odourless. Straight alkyds produced from this fatty acid may show signs of brittleness and in practice soya-bean or dehydrated castor fatty acids are included in the resin to impart plasticity. Some precautions must be observed in formulating these acids; it should be mentioned specifically that Neofat No. 19 fatty acid alkyds do not stand overcooking, and a finishing temperature of not over 232° C. is recommended. In addition to alkyds, various other derivatives of unsaturated C_{20} acids have been prepared and studied. Pentaerythritol esters, for example, are worthy of note and closely approach tung oil in many ways.

Properties of the Glycerol Ester

In the commercial field the glycerol ester of unsaturated C_{20} acids is known as Neofat No. 19 triglyceride and its average chemical and physical characteristics are as follows:

Saponification value	177
Iodine value	205
Acid value	6
Absolute viscosity at 25° C., poises	2

Unsaturated C_{20} fatty acids with an iodine value of approximately 250 are used in the production of Neofat No. 19 triglyceride. The drop from 250 to 205 iodine value in the finished product is caused first by the change in molecular weight due to formation of the ester, and secondly to some polymerisation occurring during esterification. The properties of Neofat No. 19 triglyceride are exactly those to be expected from a highly unsaturated non-conjugated oil, free from saturated acids. It is a rapid drying material, forms clear glossy films, has good adhesion, but shows some tendency toward brittleness on ageing. Varnishes, enamels, lacquers, printing inks, linoleums, oilcloth, patent leather, putty, quick-drying paints, aluminium vehicles, core oils, and the fortifying of slower drying oils are all applications for this versatile material.

Much that has been said about the chemical processing of marine oils is also applicable to soya-bean and other semi-drying oils. For example, the fractional distillation of crude soya-bean fatty acids produces fractionated soya-bean fatty acids with iodine values of 150-160, and with characteristics similar to linseed oil when used in alkyd resins. Fractionated soya-bean fatty acids are now available commercially, and laboratory investigations of both the glycerol and pentaerythritol esters of these acids have been made.

Blast Furnace Slag

Development and Uses in Chemical Industries

THE production of pig-iron in the blast furnace is one of the fundamental unit processes the success and cost of which affect nearly every steel-using industry. Slag is a source of waste to the metallurgist because it represents wasted material and wasted heat. Formerly it was dumped on huge mounds which required space and entailed haulage and labour charges. The utilisation of slag has now become a vital factor in blast furnace economics, and useful information as to the utilisation of this material in the U.S.A., has lately been provided by W. H. Caruthers in a paper to the Industrial Minerals Division of the American Institution of Mechanical Engineers.

The latest developments are such that the blast furnace is now operated with the dual object of producing the best possible iron *and* the best possible slag. The slag may be tapped into pits each holding less than a week's production, or it may be hauled molten on to a bank in ladles, or it may be collected in large pits holding several weeks' production. From these pits or dumps it is recovered by mechanical shovels, broken, crushed and supplied in sizes generally from 4 in. down to fine powder as required by the purchaser. There is a marked similarity in composition between blast furnace slag and Portland cement as is shown in the following table :—

	Analyses of 600 slags.			Analyses of 32 Portland cements
	Max.	Min.	Average	Average
SiO_2	55.72	25.30	36.36	21.9
Al_2O_3	19.43	5.46	12.76	5.9
CaO	48.06	25.82	41.15	62.9
FeO	2.83	0.25	0.75	2.9
MnO	9.67	0.04	0.91	nil
MgO	19.86	0.10	6.57	2.6
S	5.06	0.16	1.45	1.7

The utilisation of slag follows from its properties. It has more bonding surface per unit area than any other commercial mineral aggregate because of the countless bubbles of gas that are entrapped in the molten material as it cools, causing the faces to be pitted in every individual crushed piece. It will not absorb water through these pits and become saturated because the pits are not interconnected. It is not, therefore, surprising to find that the principal use is for roads, with a subsidiary use for building. The U.S.A. figures are as follows: Railway ballast, 22 per cent.; traffic-bound roads and concrete pavements, each 16 per cent.; water-bound macadam 14 per cent.; structural concrete 13 per cent.; bituminous roads and road maintenance 15 per cent.; miscellaneous uses, 4 per cent. Among the miscellaneous uses, which will increase, are the construction of the "twenty-year" bonded pitch and felt roofs that have been recently developed in the U.S.A. by the chemical industry through the Barrett and Koppers Cos., and the use by the Flintkote Co. as a roofing material in which dyed slag granules are used for surfacing. It is interesting to note that these granules retain their dye colours satisfactorily when exposed to the weather.

It is used also in the manufacture of Portland and slag cements; slag cement is an intimate mechanical mixture of blast furnace slag with 30 to 40 per cent. of hydrated lime, no heat being used. In Portland cement, the slag is used as the siliceous material and less limestone is needed than when clay or shale is used because the slag contains both lime and silica. There are over 45 installations in America in which blast furnace slag is used as a filter medium in trickling and sprinkling filter beds.

Slag wool was first made in the U.S.A. in the 1870's and there has been a striking growth in this industry within the past 30 years. Pulverised slag has long been used in this country for the manufacture of glass, but is not used for that purpose in America. The author records that experiments at the Alabama Polytechnical Institute have shown that the composition of blast furnace slag is uniform enough for the purpose and that with admixture of arsenic, soda, etc., slag glass can be produced of almost any standard, and with many superior qualities.

Chemical Shortage in France

Nazis Aim at Killing French Industry

THE French chemical industry is seriously threatened. News from Vichy tells of a serious shortage of many essential products necessary in the manufacture of fertilisers and other chemical products, owing largely to the complete stoppage of transport between occupied and unoccupied France. Many of the important chemical firms are situated in the north and these are now in the hands of the Germans. Vichy has appealed to Paris to allow certain essential products to be "imported" into unoccupied France, but the answer is always the same, that lack of transport will not permit it. Chemical firms in unoccupied France are now convinced that the German aim is to complete the ruin of the French chemical industry for the benefit of Germany. But meantime the medical faculties are lacking the necessary drugs and doctors have complained to the Government that they are unable to procure their requirements for their work. *Le Figaro* recently described how professors of the Lyons Faculty of Medicine combed the country for drugs and eventually had to give up the search.

Paper from Apple Stalks

Owing to the blockade and German occupation of a large part of the country there is an acute paper shortage throughout France. It is reliably reported that Vichy has asked the Germans to advise them on the manufacture of paper from apple stalks and leaves. There is a large paper factory in Thuringia specialising in the manufacture of this paper and exports are to visit France to discuss the organising of similar factories. The Germans insist that the factories must remain German, however, and not French. It is also learned that quite recently a box of letter paper made from apples was presented to Hitler.

BRITISH RHEOLOGISTS' CLUB

Since the outbreak of war new and urgent problems concerning the flow and deformation properties of materials (rheology) have arisen in many industries and in research, and a group of British rheologists have therefore formed a club for mutual help and discussion, and Professor G. I. Taylor, F.R.S., has accepted the presidency. The objects of the new club are "to co-ordinate the activities of rheologists in Britain during the war, to further the appreciation of the importance of rheology in industry and to facilitate the pooling of information (where it is desirable) with respect to problems and new methods of research." Membership of the club is open to any individual working or interested in rheology who is resident anywhere in the British Empire, and there is a nominal subscription of five shillings per annum. Arrangements are in preparation for an inaugural meeting of the club to be held at the National Institute for Research in Dairying, University of Reading, on November 16, when it is proposed to hold an informal discussion on a topic to be selected, followed by an inspection of the rheological apparatus, including some recent developments. Fuller details may be obtained from the Honorary Secretary, Dr. G. W. Scott Blair, c/o The Institute of Physics, The University, Reading, Berks.

Personal Notes

MR. A. R. MCKENZIE, temporary assistant chemist at the Clarence Dock Power Station of the Liverpool Corporation, has been appointed assistant works chemist.

MR. FRANK G. HOUGHTON, formerly proprietor of the Barnoldswick Aniline Company, Barnoldswick, and for over 20 years owner of a chemical works in Rochdale Road, Manchester, celebrated his 85th birthday recently.

MR. JOHN CECIL BUDD and MR. WILLIAM MURE have been appointed by the Minister of Supply to be joint controllers of non-ferrous metals in succession to Captain Oliver Lyttelton. Mr. Budd will give special attention to copper and lead, and Mr. Mure to zinc and brass.

DR. M. BARASH and MR. G. J. GREENFIELD have been appointed by the Mines Department as full time technical advisers to the Advisory Committee on Benzol Recovery. Dr. Barash (who has been released by Messrs. West's Gas Improvement Company for the duration of the war) and Mr. Greenfield are already at work advising gas engineers and coke oven managers as to the best methods to be adopted for improving yields of crude benzol, and in examining the possibilities of installing plants on works not already recovering.

DR. J. V. N. DORR has been elected to receive the Perkin Medal of the Society of Chemical Industry (American division) for 1941. His many inventions include the Dorr Classifier, which has been called "the piece of equipment that comes nearest to being in universal use in modern hydrometallurgy," the Dorr Thickener, the Dorr Agitator and Continuous Counter Current Decantation. He is at present the active head of the Dorr Company, Inc. The medal will be presented on January 10, 1941, at a meeting to be held at the Chemists' Club, 52 East 41st Street, New York City. Details will be announced later.

OBITUARY

MR. ANDREW WALLACE, a former chemical merchant of Glasgow, died last week in his native city.

MR. WILLIAM HARRISON, manager of the Scottish Central Iron Company since its inception in 1902, died last week at Falkirk, aged 67.

MR. ROBERT SMITH, senior partner in the firm of Messrs. Henderson, Hogg and Co., chemical and dyestuff merchants, Glasgow, died recently, aged 84.

MR. JAMES JACKSON, J.P., who died recently at Stirling, aged 78, was formerly secretary and director of Messrs. R. Pullar and Sons, Ltd., bleachers, Bridge of Allan. He retired in 1931, after 52 years' service with the company.

MR. WILLIAM JOHN ALCOCK, M.I.Chem.E., well known as a consulting chemical engineer in Calcutta, died recently in India, aged 64. He was born at Northwich, Cheshire, and had held appointments as chemical engineer at Plymouth, at Hayle, and at Hapton, Lancs., where he was engineer and manager to John Riley and Sons from 1905 to 1912. His association with India started with his appointment in 1916 to the Indian Munitions Board, and from the end of the last war he had devoted himself to the development of the heavy chemical industry in India.

PROFESSOR NORMAN THOMAS MORTIMER WILSMORE, F.I.C., M.I.Chem.E., who died recently at Perth, Western Australia, aged 72, was head of the Department of Chemistry in the University of Western Australia from 1913 to 1937, varying this work with a period of service in the Department of Explosives Supply in London during the last war. He was a native of Melbourne, Australia, but had studied at University College, London, and at Göttingen, and had held academic appointments at Zurich and at University College, where he was lecturer and assistant professor in 1903-13.

Chemical Compounds as Fluxes

Some Low-Melting-Point Materials

SODIUM compounds are used in welding and a well-known white flux powder with strong oxidising power consists of sodium carbonate, sodium nitrate, and sodium nitrite. Compounds of all the alkali metals are good fluxes, but the sodium compounds are usually the cheapest. Sodium tetraborate is unusual in having fluxing power in both its cation and its anion.

Several other chemical compounds, including certain naturally-occurring minerals, find special use in coatings and fluxes as well as in soldering, and certain of these, with their attributes, are usefully summarised in Bureau of Mines Information Circular 7121 (1940).

Sodium bifluoride, $NaHF_2$, a poisonous white crystalline powder soluble in water, is a powerful flux of low melting point.

Pyrophosphoric acid, $H_4P_2O_7$, is a viscous syrupy liquid that tends to solidify on long standing at ordinary temperature. Its melting point is 61° C. It is useful as a catalyst in certain processes and in the manufacture of organic phosphate esters. When diluted with water, pyrophosphoric acid is rapidly converted to orthophosphoric acid, which finds use in soft-soldering fluxes and leaves no residue to cause corrosion.

Phosphoric acid, H_3PO_4, a clear liquid or a transparent crystalline solid according to temperature and concentration, and its compounds are attracting some interest in the field of soldering fluxes because any acids remaining in the residue will react with the metals to form nonhydrolysable metallic salts. Chlorides and sulphates hydrolyse readily and continue corrosion whenever moisture is present; but with phosphates the acid, when once combined with the metal, is reported to remain fixed and its corrosive powers to become exhausted.

Alkyl acid phosphates, such as monoamyl orthophosphate, have good wetting powers, the monoamyl phosphate in particular being of interest in soldering. No obnoxious fumes are given off when the work is done in a confined place; the spattering characteristic of some fluxes is eliminated and the corrosive residues are avoided.

Columbite, a blackish iron-manganese-columbium mineral that occurs with tantalite and is used in stainless steels, is also employed in welding these steels. Columbite has a gravity of about 5.3 and a hardness of 6. As in its use in stainless steel, some columbium is lost in welding.

New Control Orders

Sale of Dyestuffs

THE Board of Trade has made an order prohibiting the sale or supply, except under licence, of dyestuffs wholly or partly manufactured in the United Kingdom. Sir Robert Waddington has been appointed controller with power to issue licences. The order will be in force from Wednesday, October 23. Applications for licences should be made to the Controller of Dyestuffs, Board of Trade, 42 King Street West, Manchester 3.

Imports of Glassware

From October 18 the Treasury are exempting from key industry duty till December 31, 1940, optical glass and optical elements, optical instruments (and parts thereof), scientific glassware, lamp-blown ware, laboratory porcelain, scientific instruments (and parts thereof), certain gauges and measuring instruments of precision, and certain vacuum tubes. The same articles and parts of the gauges and measuring instruments are also being exempted from duty under the Import Duties Act, 1932. Import licences will continue to be issued only in respect of consignments which are essential.

General News——From Week to Week

MESSRS. COATES AND COOPER, LTD., have set up offices at 21 Eastbury Road, Northwood, Middlesex, to which address all communications should be sent.

THE TEMPORARY ADDRESS of Messrs. A. Connell and Co., Ltd., aniline dyestuff manufacturers, is "Cranbrook," Marsh Lane, London, N.W.7. Tel.: MILl Hill 1411.

THE MANCHESTER SECTION of the Oil and Colour Chemists' Association has decided that it is inadvisable to hold meetings during the remainder of this year. The situation will be reconsidered later, and the activities of the Section in the usual or a modified form will be resumed at the earliest opportunity.

THE GAS ENGINEER TO CARLISLE CITY COUNCIL has reported that the Mines Department of the Board of Trade has approached him regarding the setting up of plant for the recovery of benzol at the gasworks. Estimates are to be prepared for submission to the Gas Committee.

ONLY SIXTY-EIGHT MOULDERS out of a total district membership of 3000 were unemployed in the Falkirk area at the end of September, according to the report by Mr. Hugh Murdoch, Falkirk, secretary of the Ironfounding Workers' Association. A good many men in the light castings industry, however, are on short time, the periods worked being three or four days a week.

THE INAUGURAL MEETING of the Manchester branch of the Institute of Export was held on Thursday, in the Midland Hotel, with Sir Joseph Nall, M.P., in the chair. Speakers included Mr. Harcourt Johnstone, M.P., Parliamentary Secretary to the Department of Overseas Trade, Sir Patrick Hanson, M.P., President of the Institute of Export, and Mr. T. H. Hewlett, M.P., director of the Anchor Chemical Co., Ltd.

ROCK DEPOSITS OF PHOSPHATES, which were located in County Clare, Eire, some seven years ago are now being worked by a private company. The phosphates are being converted into fertilisers in Galway and experiments made by the Department of Agriculture have shown that phosphates from this source are very satisfactory. The development of these deposits, in view of the need for home-produced fertilisers at the present time, is regarded as of national importance.

THE EIRE GOVERNMENT has announced that it will again buy kelp in certain of the northern and western seaboard districts of the country next year. The prices, which have been fixed by the Department of Lands, are as follows: kelp containing .8 per cent. or more iodine, £5 10s. per ton; kelp containing less than .8 per cent., but not less than .75 per cent. iodine, £5 per ton; kelp containing less than .75 per cent. iodine, but not less than .7 per cent., £4 per ton.

Foreign News

A CENSUS IS BEING TAKEN in the United States by the American Chemical Society of all chemists and chemical engineers, recording in detail the specialised services to the State which they are prepared and qualified to perform.

DIRECT PRODUCTION OF PHOSPHOLIC ACID from phosphorus was begun recently in the new Los Angeles plant of the A. R. Maas Chemical Company. Much of the output will be used for the manufacture of sodium phosphates.

THE PALESTINE GOVERNMENT has advanced £7000 for the experimental cultivation of soya beans in the country. The acreage under this crop is expected next year to be over thirty times its present extent.

THE FISCHER-TROPSCH PLANT of the Manchuria Synthetic Fuel Co., at Chinchow, is reported to be nearly completed. Designed to produce 52,000 tons of liquid fuel annually, the plant was started three years ago, but completion was delayed by lack of exchange funds and latterly by difficulties in obtaining equipment from Germany.

ACCORDING TO INFORMATION RECEIVED by the British Columbia Department of Trade and Industry, a copra-pressing plant costing $200,000 is to be established at Vancouver. The plant will be the first of its kind in Canada. Present plans assign to the works a capacity of 1500 tons of copra per month, from which about 900 tons of coconut oil and 600 tons of copra meal can be derived.

AT YARRAVILLE, MELBOURNE, a power alcohol plant has been erected by the Colonial Sugar Refining Company. The spirit is produced from molasses, as in the company's Queensland plant.

REUTER REPORTS THAT Mysore and Travancore States have accepted large contracts from the Indian Central Government for burnt coconut shell for activated charcoal production.

THE JAPANESE MINISTRY OF COMMERCE has announced further restrictions on the use of nickel and nickel alloys, following the reduction of imports of the metal from Canada and Norway.

THE NET PROFIT of the Electrolytic Zinc Co. of Australasia for the year to June 30 last, after providing £100,000 for amortisation and depreciation and £163,396 for taxation, was £448,782. The net profit for the previous year was £405,756.

OUTPUT OF TUNGSTEN CONCENTRATES in the Union of South Africa last year was about 95 short tons with an average WO_3 content of 68 per cent. Sales and shipments were 90 tons for the year.

EXPORTS OF CAUSTIC SODA from Japan in May totalled 1119 metric tons, compared with 1961 tons in April and 2161 tons in May, 1939. Exports of sulphur in May totalled 2099 metric tons, compared with 4025 tons in April and 1761 tons in May, 1939.

A QUININE FACTORY to be erected in Ceylon is expected to be ready in a month. The project, it is understood, is connected with the attempts now being made by the Department of Agriculture in Ceylon towards the steady cultivation of cinchona bark in the island.

EXPORTS OF CHEMICALS and chemical products from Chinese territory under Japanese control in June were valued at 3,741,000 gold units, compared with 4,079,000 gold units in May and 3,476,000 units in April; exports during the first half of 1940 were valued at 21,793,000 units, compared with 6,132,000 units in the same period of 1939.

ACCORDING TO THE INSTITUTO DO ASSUCAR E DO ALCOHOL, production of Brazilian alcohol during the calendar year 1940 will reach a new record of 109,800,000 litres, of which 51,300,000 litres will be anhydrous, compared with 96,714,500 litres, of which 38,171,500 litres were anhydrous, in 1939, and 81,024,000 litres in 1938.

NET PROFITS OF THE FOUR leading Japanese chemical companies for the first half of 1940 totalled 13,855,000 yen, compared with 11,791,000 yen and 12,635,000 yen in the first and second halves of 1939. Net profits of the three leading alkali companies in the same period totalled 4,556,000 yen, compared with 3,630,000 yen and 4,117,000 yen in the first and second half of the previous year.

GREAT BUILDING ACTIVITY among the leading American industrial chemical concerns is announced. The construction of a new phosphate plant by the Monsanto Co. was reported some time ago, and information has now been received of a new plant being begun by General Chemicals, also in the Detroit area. Mathieson Alkali and Du Pont are reported to be making extensions in the Niagara Falls district, and the Hercules Powder Co. are constructing a million-dollar plant at Parlin, N.J.

A DECREE PUBLISHED IN THE OFFICIAL GAZETTE of Costa Rica has established a Government monopoly on salt, to be in force for five years, but not to become effective until regulations have been issued by the Government. Under the monopoly, only the Government will be permitted to import salt, and its manufacture within the country will be restricted to persons or firms authorised by the Government. The Government itself is prohibited from manufacturing salt, but will form a co-operative organisation for its production and distribution. Prices are to be fixed by the Minister of Finance.

EXTENSIVE PETROLIFEROUS STRATA have been discovered in the Poltava Province of Russia, 12 miles from the town of Lubny, by a party from the Ukrainian Oil Prospecting Trust "The finding of oil crowns the efforts of many prospectors who have been working in the Poltava Province since 1936," stated Prof. B. I. Chernyshev, Director of the Kiev Institute of Geology. A geological party of the Institute has sunk twelve wells in the Lubny district, in eight of which bitumen and methane and nitrogen gases with a great concentration of hydrocarbons were found.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

MANUFACTURE OF AMINE SALTS of dinitro-phenols.—A. Abbey (Dow Chemical Co.). 14352.

METHOD OF DEGASIFICATION of liquid dispersions.—American Cyanamid Co. (United States, Oct. 13, '39.) 14399.

HALOGENATED ARYL SILICONES.—British Thomson-Houston Co., Ltd. (United States, Sept. 27, '39.) 14533.

ARTIFICIAL RESINS and coating-compositions therefrom.—Carbide and Carbon Chemicals Corporation. (United States, Nov. 29, '39.) 14393.

OXIDATION OF UNSATURATED ALDEHYDES.—Distillers Co., Ltd., H. P. Staudinger, and K. H. W. Tuerck. 14433.

MANUFACTURE OF ORGANIC COMPOUNDS.—H. Dreyfus. 14426.

PRODUCTION OF ORGANIC COMPOUNDS.—H. Dreyfus. 14480.

MANUFACTURE OF ORGANIC COMPOUNDS.—H. Dreyfus 14518, 14519.

MANUFACTURE OF PLASTIC MATERIALS.—E. I. du Pont de Nemours and Co., and B. M. Marks. 14430.

MANUFACTURE OF SURFACE-ACTIVE MATERIALS.—E. I. du Pont de Nemours and Co., and J. H. Werntz. 14428.

PREVENTION OF CAKING or settling of ammonium nitrate or ammonium nitrate compositions.—E. I. du Pont de Nemours and Co., T. W. Hauff and H. H. Holmes. 14429.

FIRE-EXTINGUISHING MATERIALS.—Imperial Chemical Industries, Ltd. (Du Pont de Nemours and Co.). 14546.

MAGNESIUM ALLOYS.—Magnesium Elektron, Ltd., and C. J. P. Ball. 14503.

PROCESS FOR THE MANUFACTURE OF DICANOSTILBENES.—May and Baker, Ltd., and H. J. Barber. 14543.

MANUFACTURE OF GRANULAR SUPERPHOSPHATE.—J. T. Procter. 14441.

MANUFACTURE OF UNSATURATED OXYGENATED ORGANIC COMPOUNDS. Standard Oil Development Co. (United States, Nov. 13, '39.) 14366; (United States, Dec. 1, '39.) 14367.

TREATMENT OF PERMANENT MAGNET ALLOYS.—Swift, Levick, and Sons, Ltd., and F. W. Tetley. 14438.

Complete Specifications Open to Public Inspection

PRODUCTION OF SOLUTIONS OF CELLULOSE IN STRONG MINERAL ACIDS.—I. G. Farbenindustrie. Aug. 30, 1938. 24596/39.

MANUFACTURE OF SHEETS OR BANDS from highly-viscous cellulose solutions.—Kalle and Co. A.-G. Aug. 29, 1938. 24597/39.

MANUFACTURE OF POLYMERIC SUBSTANCES, and shaped articles therefrom.—E. I. du Pont de Nemours and Co. Aug. 26, 1938. 24611/39.

METHOD AND APPARATUS FOR CATALYTIC CRACKING.—M. W. Kellogg. Aug. 29, 1938. (Cognate Application, 24674/39.) (Cognate Application, 24674/39.) 24673/39.

PROCESS FOR THE MANUFACTURE OF O-SUBSTITUTED DIHYDROXY-DIPHENYL ALKANE COMPOUNDS.—Schering A.-G. Aug. 29, 1938. 24744/39.

POLYMERIC QUATERNARY AMMONIUM SALTS from ditertiary diamines and dihalides.—E. I. du Pont de Nemours and Co. Aug. 30, 1938. 24771/39.

PROCESS FOR THE FRACTIONAL SEPARATION OF MIXTURES comprising vaporous and gaseous hydrocarbons.—Universal Oil Products Co. Aug. 31, 1938. 24836/39.

RECOVERY OF HIGHER OXYGEN-CONTAINING ORGANIC COMPOUNDS from crude oils obtained by the catalytic hydrogenation of carbon oxides.—I. G. Farbenindustrie. Aug. 30, 1938. (Cognate Application, 24883/39.) 24882/39.

MANUFACTURE AND PRODUCTION OF WATER-SOLUBLE DYESTUFFS.—I. G. Farbenindustrie. Aug. 30, 1938. 24884/39.

POLYMERISATION OF VINYL COMPOUNDS.—I. G. Farbenindustrie. Aug. 30, 1938. 24902/39.

PROCESS FOR AROMATISING AND DEHYDROGENATING HYDROCARBONS. Ruhrchemie A.-G. Aug. 30, 1938. (Cognate Applications 24907-11/39.) 24906/39.

MANUFACTURE OF ACYLATED AMMONIUM-DIARYLMETHANE COMPOUNDS.—J. R. Geigy A.-G. Sept. 1, 1938. 24990/39.

STEROL COMPOUNDS, and process for their preparation.—E. I. du Pont de Nemours and Co. Sept. 2, 1938. 24998 9/39.

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. Sept 1, 1938. 25028/39.

PRODUCTION OF POLYAMIDES.—E. I. du Pont de Nemours and Co. Sept. 29, 1938. 26816/39.

MANUFACTURE OF POLYMERIC MATERIALS.—E. I. du Pont de Nemours and Co. Sept. 30, 1938. 26884/39.

MANUFACTURE OF SYNTHETIC RESINS.—E. I. du Pont de Nemours and Co. Sept. 30, 1938. 26886/39.

POLYMERISABLE COMPOSITIONS.—British Thomson-Houston Co., Ltd. Oct. 1, 1938. 26932.

VAPORISATION OF ADIPIC ACID.—E. I. du Pont de Nemours and Co. Sept. 30, 1938. 27000/39.

MANUFACTURE OF POLYMERIC MATERIALS.—E. I. du Pont de Nemours and Co. Sept. 30, 1938. 27001/39.

PRODUCTION OF POLYAMIDES.—E. I. du Pont de Nemours and Co. Sept. 30, 1938. (Cognate Application 27003/39.) 27002/39.

MANUFACTURE OF ARTIFICIAL FILAMENTS.—E. I. du Pont de Nemours and Co. Sept. 30, 1938. (Cognate Application 27007/39.) 27006/39.

CATALYSTS, and the cracking and conversion of hydrocarbon oils therewith.—Standard Oil Development Co. March 22, 1939. 2879/40.

HYDROGEN-FURNACE METHOD FOR STELLITING VALVES.—Haynes Stellite Co. March 17, 1939. 3086/40.

MANUFACTURE OF MIXED ESTER-ETHER COMPOUNDS OF POLYALCOHOLS.—Soc. of Chemical Industry in Basle. March 23, 1939. 3357/40.

PRODUCTION OF TRANSPARENT OXIDE COATINGS on aluminium or aluminium alloys.—R. Bosch Ges. March 18, 1939. 3693/40.

PROCESS FOR THE PRODUCTION OF BITUMINOUS MATERIALS.—N. V. de Bataafsche Petroleum Maatschappij. March 20, 1939. 4360/40.

PROCESSES FOR DISSOLVING CRUDE CALCIUM ALUMINATES in water. J. C. Seailles. March 22, 1939. 4648/40.

PROCESS FOR REGENERATING spent metal catalysts.—Universal Oil Products Co. March 22, 1939. 4713/40.

MANUFACTURE OF SUPERPHOSPHATES and compound fertilisers.—Entreprise R. and J. Moritz. March 17, 1939. 4721/40.

METHOD OF INITIATING and/or maintaining chemical reaction between fluids.—S. A. Manifattura Ceramica Pozzi. March 21, 1939. 4751/40.

DRYING-APPARATUS FOR CASEIN or other granular products—Etablissements A. Pillet and Fils. March 18, 1939. 4872/40.

OXIDATION OF ALCOHOLS.—British Celanese, Ltd. March 17, 1939. 4916/40.

PREPARATION OF WATER-SOLUBLE DERIVATIVES of 2-sulphanilylamidopyridine.—Merck and Co., Inc. March 23, 1939. 5168/40.

METHOD OF PURIFYING and concentrating of rubber latex by centrifuging. A. B. Separator. March 20, 1939. 5202/40.

PROCESS FOR THE MANUFACTURE of a synthetic balsam of condensation.—L. C. F. Pechin. March 23, 1939. 5460/40.

PROCESS FOR THE CATALYTIC CONVERSION OF HYDROCARBON OILS. Universal Oil Products Co. March 22, 1939. 6038/40.

Complete Specifications Accepted

PREPARATION OF CARBON TETRACHLORIDE.—Consortium für Electrochemische Industrie Ges. Oct. 4, 1937. 519,220.

PREPARATION OF SALTS OF SULPHO-CARBOXYLIC ACID ESTERS of alcohols.—B. R. Harris. Feb. 11, 1938. 519,230.

PROCESS FOR THE MANUFACTURE OF UNSATURATED COMPOUNDS of the cyclopentanopolyhydrophenanthrene series.—Schering A.-G. Oct. 5, 1937. 519,233.

CARBONISATION OF CARBONACEOUS MATERIALS.—Institution of Gas Engineers and F. J. Dent. Oct. 7, 1938. 519,246.

PROCESSES FOR TREATING NATURALLY OCCURRING STARCHY MATERIALS in order to saccharify them—Usines de Melle. Oct. 26, 1937. 519,268.

REMOVAL OF HYDROGEN SULPHIDE FROM GASES.—Courtaulds, Ltd., A. D. Heywood, R. S. Thomas and E. H. Sharples. Oct. 12, 1938. 519,274.

PRODUCTION OF CONCENTRATED SOLUTIONS of hydrogen peroxide. H. Schmidt. Oct. 12, 1937. 519,276.

PROCESS FOR THE MANUFACTURE OF IODO DERIVATIVES OF STEROID COMPOUNDS.—B. Helferich. Oct. 12, 1937. (Samples furnished.) 519,277.

RESINOUS COMPOSITIONS.—British Thomson-Houston Co., Ltd. Oct. 16, 1937. 519,349.

DYEING OF CELLULOSE DERIVATIVES and other highly polymerised compounds.—Soc. Rhodiaceta. Nov. 1, 1937. 519,361.

MANUFACTURE OF MONOAZO DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie). March 31, 1938. 519,514.

PURIFICATION OF AQUEOUS ALKALI-METAL HYDROXIDES.—A. H. Stevens (Pittsburgh Plate Glass Co.). June 17, 1938. 519,415.

CONCENTRATION OF AQUEOUS ALKALI-METAL HYDROXIDES.—A. H. Stevens (Pittsburgh Plate Glass Co.). June 17, 1938. 519,416.

MANUFACTURE OF SOAP, and apparatus therefor.—Refining, Inc. May 28, 1937. 519,516.

CEMENT, CONCRETE OR MORTAR, and processes for manufacturing the same.—T. W. Dickeson. June 20, 1938. 519,569.

PROCESS FOR THE MANUFACTURE OF SULPHUR TRIOXIDE.—Soc. des Produits Azotes. June 28, 1937. 519,570.

MANUFACTURE OF STABLE DIAZO SALTS.—E. I. du Pont de Nemours and Co., W. A. Erickson and F. W. Wanderer. July 22, 1938. 519,574.

BLEACHING OF CELLULOSIC MATERIAL.—Mathieson Alkali Works. Sept. 1, 1937. 519,522.

CATALYTIC APPARATUS, particularly for the conversion of hydrocarbons.—Socony Vacuum Oil Co., Inc. Sept. 1, 1937. 519,371.

MANUFACTURE OF HALOGENATED DERIVATIVES of ethylene polymers.—J. R. Myles, F. S. Bridson-Jones and Imperial Chemical Industries, Ltd. Aug. 23, 1938. 519,422.

PRODUCTION OF POLYVINYL RESINS.—Kodak, Ltd. Oct. 2, 1937. (Addition to 513,266.) 519,378.

MANUFACTURE OF MALTOSAMINES.—E. I. du Pont de Nemours and Co. Sept. 21, 1937. 519,381.

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. Oct. 25, 1937. (Addition to 511,692.) 519,432.

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. April 26, 1938. (Addition to 511,692.) 519,433.

MANUFACTURE OF INDOPHENOL-LIKE COMPOUNDS of the naphthocarbazole series.—I. G. Farbenindustrie. April 13, 1938. 519,434.

PROCESS FOR THE MANUFACTURE OF DYESTUFF INTERMEDIATES, and of azo dyestuffs insoluble in water therefrom.—A. Kershaw, K. H. Saunders and Imperial Chemical Industries, Ltd. Sept. 22, 1938. 519,437.

PROCESS FOR THE MANUFACTURE of light and porous materials from natural cellulose fibres and cement or mortar.—R. Handl and W. F. Wagner. Sept. 25, 1937. 519,547.

MANUFACTURE OF HYDROGEN PEROXIDE.—G. Adolph and M. E. Bretschger. Nov. 17, 1937. 519,467.

PREPARING STEROID-LIKE DERIVATIVES, and products obtained thereby.—Naamlooze Vennootschap Organon. Oct. 16, 1937. 519,468.

SOLUBLE MINERAL OILS suitable for use in metal working.—Standard Oil Development Co. Jan. 11, 1938. 519,477.

TREATMENT OF CELLULOSIC MATERIAL.—C. H. Field. Oct. 19, 1938. 519,600.

POLYGLYCOL DERIVATIVES, and their use in treating textiles.—British Celanese, Ltd. Oct. 26, 1937. 519,388.

REMOVAL OF MERCAPTANS from mercaptide solutions.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Nov. 15, 1937. 519,397.

MANUFACTURE OF SUBSTITUTED PARAQUINONES and hydroquinones with particular reference to the improved manufacture of ψ cumoquinone and ψ-cumohydroquinone.—British Drug Houses, Ltd., H. B. Fraser, and G. E. H. Skrimshire. Oct. 21, 1938. 519,398.

MANUFACTURE OF SATURATED AND UNSATURATED COMPOUNDS of the bis-nor-cholanic acid and aetio-cholanic acid series, and substitution products thereof.—Soc. of Chemical Industry in Basle. Nov. 9, 1937. 519,507.

MANUFACTURE AND PRODUCTION OF LIQUID HYDROCARBONS.—G. W. Johnson (I. G. Farbenindustrie). July 15, 1938. (Divided out of 21086/38.) 519,613.

MANUFACTURE OF ADHESIVE BITUMINS.—Standard Oil Development Co. Jan. 26, 1938. (Divided out of 519,119.) 519,463.

METHOD OF AND APPARATUS FOR MAKING SOAP.—Refining, Inc. May 28, 1937. (Divided out of 519,516.) 519,565.

FERROUS ALLOYS.—Inland Steel Co. Nov. 30, 1937. (Divided out of 519,572.) (Cognate Application 2792/40.) 519,615.

CONCENTRATION OF AQUEOUS ALKALI-METAL HYDROXIDES.—A. H. Stevens (Pittsburgh Plate Glass Co.). June 17, 1938. (Divided out of 519,416.) 519,616.

CHARCOAL KILNS.—C. Whitfield. Feb. 15, 1939. 526,416.

ABSORPTION OF BROMINE.—A. T. Williamson, and Imperial Chemical Industries, Ltd. Feb. 18, 1939. 526,542.

FILLERS FOR VINYL RESIN PLASTICS.—Carbide and Carbon Chemicals Corporation. April 15, 1938. 526,345.

MANUFACTURE OF CATALYSTS, and the treatment of hydrocarbons therewith.—Standard Oil Development Co. May 20, 1938. 526,355.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Receivership

ROBINSON AND CO. (CHEMISTS), LTD., 12 Bank Street, Norwich. (R., 19/10/40.) G. A. Riches, of Bank Street, Norwich, appointed Receiver and Manager in place of E. J. Riches (deceased).

Company News

Cellon, Ltd., have declared an interim dividend of 10 per cent., less tax, on ordinary shares (last year the same).

Nominal capital of **Ward Blenkinsop and Co., Ltd.,** has been increased by £10,000 in £1 shares, to £60,000.

A like increase has been made by **Smith Bros. and Co. (Oil Distillers), Ltd.,** bringing their nominal capital up to £50,000.

Eastwoods Lewes Cement report a net profit for the year to June 30, 1940, of £9385. Meeting, 47 Belvedere Road, S.E.1, October 24, at noon.

Associated Clay Industries, Ltd., are declaring no interim dividend on ordinary shares for the year ending December 31, 1940. (Last year interim 2½ per cent.).

British Rayophane, Ltd., show a trading profit of £42,051 for the year ended March 31, 1940 (£31,775). Final dividend 2½ per cent., making 5 per cent. for the year (last year nil).

The directors of **Savory and Moore, Ltd.,** have declared payment of interest on 5 per cent. first mortgage debenture stock for half-year ending October 31.

The Metallo-Chemical Refining Company, Ltd., Palmerston House, Old Broad Street, E.C.2, have increased the nominal capital by the addition of £40,000, in £1 ordinary shares, beyond the registered capital of £10,000.

Knoll, Ltd., manufacturing chemists and druggists, etc., 60 Welbeck Street, London, W.1, have increased their nominal capital by the addition of £700, in £1 ordinary shares, beyond the registered capital of £500.

Chemical Trade Inquiries

Burma.—A firm of agents established at Rangoon wishes to obtain the sole representation for Burma, on a commission basis, of United Kingdom manufacturers of margarine (for cakes, etc.) and citric acid (bulk). (Ref. No. 507.)

Netherlands East Indies.—A firm of agents established at Bandoeng wishes to obtain the representation of United Kingdom manufacturers of centrifugal 3 h.p. petrol driven pumps. (Ref. No. 512.)

Chemical and Allied Stocks and Shares

UNDER the lead of the further rise in British Funds, most sections of the Stock Exchange showed a firm undertone, although business was again small, and the general disposition was to await the Bill giving the Government's plans for insurance against air-raid damage. Best prices recorded in the past few days were not held, but most shares of companies connected with the chemical and kindred industries were quite well maintained, and where changed, movements were in favour of holders.

Imperial Chemical at 27s. 6d. held virtually all last week's rise, while the preference units further improved from 28s. 9d. to 29s. B. Laporte at 50s. were unchanged, awaiting the interim dividend announcement, while Fison Packard were around 28s. pending declaration of the final dividend, and Burt Boulton and Haywood ordinary were 9s.xd. British Oxygen were firm at 60s., and Dunlop Rubber were around 30s., while Turner and Newall were marked up to 62s. 6d. on the more encouraging dividend estimates now current in the market. Hopes of improved earnings for the past financial year were reflected by continued firmness in Imperial Smelting ordinary at around 9s. 9d. General Refractories were 6s. 9d., and elsewhere, Lever and Unilever were marked up sharply to 23s. 6d. on more hopeful views as to the payment of an interim dividend, while the company's preference units were better, the 8 per cents. having improved to 23s. United Molasses lost part of their recent rise and were 20s. 3d., but are "ex" the interim payment.

Securities of companies associated with the supply of building materials remained firm, and Wall Paper deferred kept the recent rise to 18s. 1½d., which followed declaration of the dividend. Associated Cement were 60s. and Tunnel Cement 31s. 3d., while British Plaster Board 5s. shares were quoted at 12s. International Paint kept at 65s., and Pinchin Johnson at 19s. were unchanged on balance. Cerebos and British Match were firm on expectations that the forthcoming interim dividends will be unchanged, and in other directions Borax Consolidated deferred were maintained at 25s. 7½d. Amalgamated Metal shares made the improved price of 14s. 9d.

Tube Investments were steady at 81s. 6d. on the maintained distribution for the past financial year, and Stewarts and Lloyds were firm at 39s. The latter company is, of course, a shareholder in Tube Investments. On further consideration of the annual results, United Steel were 18s. 9d., while hopes that the dividend may be unchanged drew further attention to Dorman Long ordinary, which were higher at 20s. 3d. Babcock and Wilcox at 24s. were little changed on balance, and Staveley ordinary were 40s. Movements in textile securities were moderate, and Courtaulds were fairly steady around 29s., but British Celanese second preference were lower on the announcement that, owing to unsettled general conditions, no further payment in respect of dividend arrears is to be made at this stage. Elsewhere, Triplex Glass 10s. shares were quoted at 16s. 9d. and United Glass Bottle and shares of other glass companies were inactive; results of Redfearn Brothers are due shortly. William Blythe 3s. shares were around 5s. 3d., and Greeff-Chemicals 5s. ordinary were again quoted at par, while Monsanto Chemicals 5½ per cent. preference remained at 21s. 3d.

Boots Drug were steady around 40s., and Beechams Pills 2s. 6d. deferred were 8s. 3d., while Griffiths Hughes were 7s., and Sangers 18s. Timothy Whites were 18s. 3d. Among other securities, the units of the Distillers Co. remained steady at 56s. 6d. Barry and Staines kept their recent rise to 25s. 7½d. on interim dividend estimates, while Michael Nairn were marked up to 41s. 3d. Among oil shares slightly lower prices ruled for "Shell" and other leading issues, but Trinidad Petroleum Development were steady on the financial results.